



## Subject card

Subject name and code	, PG_00056115						
Field of study	Mechatronics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Dariusz Mikielewicz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	30	0.0		0.0		30
Subject objectives	To acquaint the student with heat transfer processes and the methods of determining the required heat transfer surface in exchangers and their different types						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W08] knows and understands design and production processes of elements and simple mechatronic devices	can determine the required heat transfer surface area			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U05] is able to use properly chosen tools to compare design solutions of elements and mechatronics systems according to given application and economic criteria (e.g. power demand, speed, costs)	Understands examples from practical applications of heat transfer presented in lecture			[SU4] Assessment of ability to use methods and tools		
	[K6_U06] is able to identify and formulate specification of simple, practical engineering tasks, distinctive for mechatronics	knows the laws related to heat transfer, also for non-stationary topics			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W10] has a basic knowledge about development trends in terms of engineering and technical sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering, adequate for Mechatronics course	knows the mechanisms of heat exchange in mechatronic systems			[SW1] Assessment of factual knowledge		
Subject contents	1. Classification of heat exchangers. Applications of heat exchangers in engineering practice. 2. Mechanisms of heat transfer 3. Approximate methods for determining heat transfer in non-stationary systems 4. Procedures for determining the heat transfer surface by means of the mean logarithmic temperature difference and epsilon-NTU method 5. Mini-channel heat exchangers 6. development of operating characteristics of exchangers 7. heat exchanger sizing optimization						

Prerequisites and co-requisites	Thermodynamics, fluid mechanics, engineering graphics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture - test	60.0%	100.0%
Recommended reading	Basic literature	1. Lecture notes	
	Supplementary literature	Every book from the area of heat exchangers.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		